

Title

Experimental study of the partial catalytic dehydrogenation of selected kerosene components with Pt-Sn/gamma-Al₂O₃

Authors

Pearson K, Käfer T, Kraaij G, Wörner A

Source

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Abstract

The partial catalytic dehydrogenation has been carried out with defined model components and model mixtures representing hydrocarbon groups and chemical composition of desulfurized Jet A-1 over 1.0 wt% Pt/Sn catalyst on gamma-Al₂O₃ carrier. The hydrogen yield, cracking products and carbon deposit on the catalyst surface are studied in order to define suitable reaction conditions for a pressurized auxiliary power unit concept with gas conditioning for fuel cell systems. The results show that alkanes lead to high cracking rate and carbon deposit which can be suppressed with increased pressure up to 8 bar. The hydrocarbon group cycloalkanes represented by methylcyclohexane shows sufficient conversion of 32 wt% towards hydrogen evolution in model mixtures under pressurized conditions. The average hydrogen yield of the model mixture of 72 nl(H₂)/kg(feed) was achieved under defined reaction conditions of 425 degrees C catalyst bed temperature, 8 bar system pressure and 4 s of contact time on the catalyst.